
Performance testing operations

Many variable scans degrade the data-transmission performance of a colocated ADM, stand-alone ADM, or MCDS that might otherwise function satisfactorily from a call-processing or features standpoint.

There are three general reasons for excessive errors:

- Human error in operation or application
- Faults in the equipment hardware and software
- Faults in the connecting transmission facility

Fault isolation ([Procedure 15](#)), therefore, becomes a matter of identifying the involved elements by taking systematic corrective action.

The error-rate specification for Meridian data feature transmission is

- In-House: one error in 10 Mbits
- Outgoing: one error in 100 Kbits (modem dependent)

In-house transmission performance testing

In-house data calls are conducted from data stations to data stations and from data stations to stand-alone ADMs or Multi-Channel Data Systems connected to DTE. Loopback testing can be performed from any data station to an in-house facility to verify the integrity of the ADM under test ([Procedure 15](#)).

Loopback testing from a known operational data station can also isolate faults to called ADMs (or Multi-Channel Data Systems) and consolidate faults to transmission lines according to the desired test sequence or transmission type in which it is used.

Interoffice data transmission performance testing

The provision of modem pooling makes inbound and outbound data calling through the Meridian 1 switching network possible. The modem pool allows data calls to be switched over voice-grade analog trunks to remote or local data facilities. This capability, while allowing efficient use of modems and trunks, adds several variables to the process of locating errors.

In addition to the probable sources of transmission error to which in-house data calls are subjected, Modem Pool calls are subject to error introduced by local modem faults, remote modem faults, and transmission gradients inherent in many Digital Distance Dialing (DDD) applications.

Techniques to isolate errors for Modem Pool calls are dependent on the type of modems supplied in the modem pool. The local loopback facility is able to test in-house ADMs or Multi-Channel Data Systems connected to the modem pool.

Outbound Modem Pool fault testing

Successful Modem Pool services begin with very careful configuration of each ADM equipped with a modem. If the modems in a modem pool are of various manufacture, each MUST BE compatible to whatever is located at the dialed remote location. During modem pool installation, ADM configuration requirements include

- Setting jumper plugs on QPC314/399 pack
- Setting the modem's VFDN on S1 on the QPC314/399 pack
- Setting S3.7 option switch to AUTO-ANSWER

It is recommended that the modem pool be located in close proximity to the PE (that is, in the equipment room). This ensures that each ADM is less sensitive to wire-gauge gradients.

Inbound Modem Pool fault testing

The same care specified for outbound pooled modems applies for the inbound pool.

ADM configuration requirements include

- Setting jumper plugs on QPC314/399 pack
- Setting the modem's DDN on S1 on the QPC314/399 pack
- Setting all S3 option parameter switches to match modem parameters
- Setting S3.7 option switch to AUTO-ANSWER

It is recommended that the modem pool be located in close proximity to the PE (that is, in the equipment room). This ensures that each ADM is less sensitive to wire-gauge gradients.

AIM and AILC fault testing

Make sure there are no pair reversals between the AIM and the AILC. Failure to maintain correct polarity within a pair prevents correct operation; for example, if logical “one” and “zero” are reversed, the AILC is unable to autobaud.

Procedure 15

Loopback testing of in-house data colocated and stand-alone ADM

- 1** Connect a Bit Error Rate Tester (BERT) or data terminal to the ADM used to control the test.
- 2** Set test station ADM switch S3.7 to AUTO ANSWER. The ADM must be equipped with a data terminal.
- 3** At the data station to be tested, set ADM switch S3 as follows:
 - S3.1—INH (Not used with Synch ADM)
 - S3.2—EVEN
 - S3.3—FDX (Not used with Synch ADM)
 - S3.4—according to DTE
 - S3.5—according to DTE
 - S3.6—4W
 - S3.7—AUTO
 - S3.8—LOOPBACK
- 4** Depending on the type of station, perform the following:
 - For colocated ADM, go to step 5.
 - For stand-alone ADM, go to step 9.
- 5** Establish a DDN call from the station under test to the test station.
- 6** Transmit a test message from the station under test.
- 7** Read the results at the station under test. Observe the performance of the ADM.
- 8** Go to step 12.
- 9** Establish a DDN call from the test station to the station under test.
- 10** Transmit a test message from the test station to the station under test.

- 11 Read the results at the test station. Observe the performance of the ADM at the station under test.
- 12 The message should return intact. The SEND and RECEIVE lamps should light.
- 13 If errors are contained in the message, repeat a loopback test after each of the appropriate fault-location procedures below are followed.
 - Conflicting S3 switch setting (for example, ENB and 8-CODE): Check S3 switch settings per step 3; check data terminal parameters. Reset S3 as required.
 - Faulty EIA cable. Check and replace if required.
 - Jumpers E12/E13/E14 on QPC315/499 are pinned for inappropriate wire-gauge setting or are pinned to a wire-gauge setting that conflicts with Data Line Card (DLC) settings.
 - Re-pin jumpers to match wire-gauge setting of DLC.
 - Observe any change in data received.

Note 1: If this action clears the errors, STOP. Retain the corrective jumper settings.

Note 2: If errors persist, conduct a wire-gauge test before proceeding to Step 13d.

- SL-1 set attached to ADM under test is faulty.
 - The DLC must be switched to stand-alone.
 - Remove ADM from SL-1 set and restore the yellow and black mounting cord leads on the SL-1 set to their standard positions.
- Test SL-1 set per *X11 features and services* (553-3001-305); replace if faulty. Reconnect SL-1 set if functioning normally.
- ADM (or MCDS) under test is out-of-range.
 - Check maximum allowable cable-feet for wire gauge used. Correct if maximum is exceeded.
- Bridge taps are present.
 - Remove any bridge taps.

- Improper connections made from ADM (or MCDS) to PE.
 - Check all physical connections and terminations.
 - Conduct continuity tests as required.
- DLC port assigned to the DLC under test is faulty.
 - Load LD 32 (Network and PE Replacement Diagnostic) and test. Replace pack if test fails.
 - If the ADM (or MCDS) assigned to the other data port on the pack is functioning normally, reassign the ADM (or MCDS) under test to that TN.
- ADM (or MCDS) under test is faulty.
 - If loopback tests were unsatisfactory after conducting the procedures in Steps (a) through (i), follow procedures shown in **Procedure 16** before replacing the ADM (or MCDS) under test.

Procedure 16
ADM troubleshooting procedures (Part 1 of 2)

Symptom	Procedure
Dark power indicator (LED).	Ensure that power transformer has an AC source. Ensure that transformer output is properly connected to ADM.
Dial tone is not returned when DDN key is operated. Data Shift key LED lights.	Ensure that all leads are properly terminated in host SL-1 set. Check switch S4-2. On QPC314 (QMT7), if terminal gives DTR, S4-2 should be up; otherwise, switch should be down. On QPC399 (QMT8), if terminal gives DTR, S4-2 should be off. Check that the terminal is set on-line.
ADM functions per Northern Telecom Publication; no response on action device (terminal).	Ensure that action device is connected to ADM using RS-232 cable. Loopback switch is off. Switch settings match between ADM and terminal.
Ring no answer (called DN flashes).	Check all cross-connect jumpers and station cabling for bridge taps or grounds. If ADM is accessing a computer port, determine if port returns DTR. On QPC314 (QMT7), set SW4 position 2 up. On QPC399 (QMT8), set S4-2 should be off. Make sure called ADM is in AUTO-ANSWER.
All LED on host SL-1 set flash.	QPC311 is not properly set, correct options per NTP. Reset ADM.
In modem pooling configuration, ADM call transfers to wrong VFDN.	Ensure that correct modem is being dialed. Ensure that VFDN SW (matrix SW) reflects modem's DN (500 lines).
In modem-pooling configuration, ADM connect and transfer but there is no input from called host.	Position loopback option SW3 position 8 to OFF. Ensure that correct baud rate. Ensure that ADM and terminal's switch settings match. Ensure that host sees correct character for items such as autobaud CR or space bar.
Terminal receives double characters with loopback option in the OFF position.	ADM SW3 position 6 must be in 4W select position. Check terminal switch settings; they should be in FDX.

Procedure 16
ADM troubleshooting procedures (Part 2 of 2)

Symptom	Procedure
When calling a colocated or stand-alone ADM, changes must be made to baud rate or any other switch position on S3.	Down-line load ADM by operating the DDN key on ADM from calling ADM.
Ringback tone stops; no connect lamp or tone.	Operate RESET switch at the called unit.
Ringback tone ends; continuous connect tone or a howl is received.	Operate RESET switch at calling unit. Call another DDN after RESET; if symptom persists, remove and replace DLC.
Garbled characters received on terminal.	Option E-12-13-14 on ADM must match option E-37-38-39 or E-52-53-54 of the DLC. See option settings ADM and DLC.

Procedure 17
AIM troubleshooting procedures

Symptom	Procedure
No response from AILC:	
AIM power indicator (LED) is dark.	Check AIM power switch. Ensure that power transformer has an AC source. Ensure that AIM transformer is plugged in. Ensure that transformer leads are properly connected to the AIM.
AIM power indicator (LED) is lit.	Ensure that terminal is powered up. Ensure that terminal is properly connected to AIM. Ensure that terminal is ON LINE. Ensure that terminal is ready for data transmission with the proper speed and other parameters correctly set up.
No response from AILC:	
AIM power lamp is steadily lit.	Ensure that AIM is properly connected to AILC. Verify that the wire pairs are not reversed. Verify that there are no open leads.
Still no response from AILC.	Use another AILC. Use another terminal. Use another AIM.
Responses are received from AILC:	
Characters are garbled.	Check bit rate of terminal. Check number of stop bits on terminal. Verify that the wire pairs are not reversed. Try a new terminal. Try a new AILC.
Some characters are missing or garbled.	Check parity setting on the terminal.
A call cannot be placed to a remote unit.	Ensure that the database is properly programmed. Ensure that the remote unit is capable of communicating with the originating terminal. Try originating a call to another terminal. Try a new AILC.

Procedure 18
MCDS troubleshooting procedures (Part 1 of 2)

Symptom	Procedure
Cannot establish the call (CONN LED dark).	Is DTR LED lit to indicate DTR is received from the attached device? — NO: (see DTR LED dark). — YES: Is wiring between MCDS and Line Card correct? — NO: (correct any defective wiring). — YES: Is DN properly configured? — NO: (correct DN configuration). — YES: Is Line Card enabled? — NO: (enable Line Card). — YES: (try a new Line Card). Are speed and transmission parameters supported by MCDS. (If the speed and transmission parameters used are not supported by MCDS, call cannot be established.) — NO: (correct defective condition). — YES: Attempt call using another port (use patch panel if available) on this or another card.
Call established, but device connected to MCDS-AC not receiving data or getting junk data.	Is RD LED lit to indicate card is transmitting data to attached device? — NO: (reestablish call using another port—(use patch panel)—on this or another card). — YES: Inspect wiring from MCDS to DTE. Check the speed and transmission parameters.

Procedure 18
MCDS troubleshooting procedures (Part 2 of 2)

Symptom	Procedure
Call established, but remote device not receiving data or is receiving junk data.	Is SD LED lit to indicate card is receiving data from the attached device? — NO: (inspect wiring from MCDS to DTE). — YES: Do speed and transmission parameters match? — NO: (correct defective condition). — YES: Reestablish call using another port (use patch panel) on this or another card.
DTR LED dark (No DTR).	Is connecting device turned on? — NO: (correct any defective condition). — YES: Inspect wiring from MCDS to terminal or computer port. (Is it connected to the selected port?) Is the connecting device providing DTR? — NO: (change to the FORCED DTR configuration on the MCDS-AC). — YES: Use another port (use patch panel) on this or another card.
More than one card on a shelf not operating properly.	Ensure that power supply is operating correctly. Inspect back panel for shorts or crosses. Inspect wiring from MCDS to DTE.
Power supply checks.	Power supply is connected to available 110 V AC supply. Power LED lights when switch is on. Fuse is not blown. Fuse is the correct value (3 amp). Use voltage test points to verify +.2, +9, -9, +5 V and GRD.

ASIM troubleshooting procedures

If the ASIM does not operate properly, perform the following checks:

- 1 Ensure that the data station is ready for data transmission with the proper speed and other parameters set on the terminal.
- 2 Ensure that the ASIM power supply is plugged in. Operate the force DTR key on the ASIM and verify the DDN lamp lights. Replace the power supply if the lamp does not light.

Note: The power supply is a field replaceable item and should not be returned to Northern Telecom for repair.

- Is data terminal power on and ON-LINE/OFF-LINE (LINE/LOCAL) switch (if equipped) set to ON-LINE (LINE)?

If the call is connected but the station is not sending or receiving data, check the following:

- 1 Is Monitor Send lamp on DTE (if equipped) or the SD lamp on the ASIM flashing while sending data?

If they do not flash, perform the following:

- 2 Ensure that the RS-232 cable is properly connected to the ASIM and DTE.
- 3 Ensure that the ON-LINE/OFF-LINE (LINE/LOCAL) switch is set to ON-LINE (LINE).

If the call is connected but illegible characters appear on the screen, perform the following:

- 1 When calling another Meridian data device, ensure that the operating controls of both data devices connected to the Meridian device match.
- 2 Ensure that the terminal is set so it does not check parity or it is set to 8 bits (no parity). If it is set for 7 bits, even or odd parity, enter a period (.) and (CR) to force the ASIM to calculate parity and to provide legible prompts.

If problems occur during call setup, disconnect and attempt to place the call again. Place the call from a regular phone to ensure that the receiving station is working before calling for service.

If pseudo random pattern 511 data is sent (Tektronix 834) in the idle mode, the keypad is made inoperative. Use the Break or Release keys to clear the condition.